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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/855,382	05/15/2001	Takuya Yamamoto	47163-00037	8941

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EXAMINER

AHMED, SHAMIM

ART UNIT

PAPER NUMBER

1765

3

DATE MAILED: 01/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/855,382

Applicant(s)

YAMAMOTO ET AL.

Examiner

Shamim Ahmed

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 May 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Regarding claim 1, lines 4-5, the phrase "plating said copper clad laminate to form interlayer electrical connections **forming etching resist layers**" renders the claim indefinite because it is unclear whether the interlayer electrical connections are formed by plating or by forming etching resist layers.

It is also not clear that what kind of material is plated on the copper clad to form the interlayer electrical connections.

4. Regarding claim 1, line 7, the use of the phrase "**thereby effecting a circuit etching treatment**" renders the claim indefinite because it is unclear how the exposing and developing the etching resist layers would effect the circuit etching treatment and it is also unclear that what kind of effect provides the exposing and the development step.

### ***Remarks***

5. In the following rejections, examiner interpreting the claim 1 as plating the copper clad to form interlayer electrical connections and forming etching resist layers on the plated via holes.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1 and 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urasaki et al (5,879,568) in view of Yates et al (6,372,113).

As to claim 1, Urasaki et al disclose a process of making a printed wiring board, wherein a via hole is formed on a copper clad using a carbon dioxide laser (col.9, lines 49-56).

Urasaki et al also disclose that plating is carried out in order to form interlayer electrical connections (col.9, lines 64-67).

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Urasaki et al further disclose that an etching resist is formed on the copper foil and which is exposed and develop in order to expose portions of the copper foil of the copper clad (col.10, lines 10-13).

Urasaki et al fail to disclose that the external copper foil of the copper clad is waved.

However, in a method of making copper clad laminates for fabrication of printed circuit board, Yates et al teach that the copper foil of the copper clad laminates is treated to make peaks and valleys or in other words, a waved copper foil is formed in order to enhance the bonding capability between the copper foil and the resin substrate (col.1, lines 7-13, col.6, lines 46-49 and col.7, lines 35-41).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Yates et al's teaching into Urasaki et al's process for increasing the bonding capability between the resin substrate and the copper foil as taught by Yates et al.

As to claim 3, Yates et al teach that the waved copper foil has a surface roughness (Rz) of about 3-8 microns or  $\mu\text{m}$  (col.7, lines 38-42).

As to claim 4, Yates et al teach that the micro-profiles (Rz) matte side of the copper foil can be overplated with the aim of equalization of the micro-profiles (Rz) (col.10, lines 15-25).

Yates et al fail to teach that the surface roughness of the waved copper foil of 10-20 micrometer.

However, it would have been obvious to one skilled in the art to optimize the same in order to increase bonding capability by increasing the roughness and furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

9. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Urasaki et al (5,879,568) in view of Yates et al (6,372,113) as applied to claims 1 and 3-4 above, and further in view of Ando et al (5,382,333).

Modified Urasaki et al discussed above in the paragraph No.8 and Urasaki et al also teach that the bulk copper foil having a thickness of less than 18  $\mu\text{m}$  (col.8 lines 61-63).

Yates et al also teach that the copper clad laminate includes a bulk or base foil and an electrodeposited bonding enhancing layer of fine copper particles (col.7, lines 38-49). Modified Urasaki et al fail to disclose that the external copper foil of the copper clad comprises a rust-preventing layer.

However, in a method of making a copper clad laminate, Ando et al teach that a finally roughened copper foil is treated for rust prevention in order to prevent oxidation, thereby permitting easy storage (col.7, lines 16-33).

Therefore, it would have been obvious to one skilled in the art at the time of claimed invention to combine Ando et al's teaching into modified Urasaki et al's process for rust prevention of the copper foil by preventing oxidation of the foil and thereby permitting easy storage as taught by Ando et al.

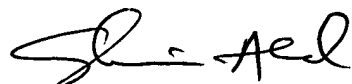
**Conclusion**

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gaku et al (6,337,463) disclose a method of making through hole with carbon dioxide laser to the copper clad laminate; and Okano et al (5,965,245) disclose a method of making a circuit board, wherein the external copper foil is roughened.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Shamim Ahmed  
Patent Examiner  
Art Unit 1765

SA  
January 13, 2003